

examined have more or less distinct basal lobes beset with spines, somewhat as in *E. lunigera*.

12. *The nepalensis Group*, including the eight species from *decorata* to *hilpa* in the key, is evidently nearly allied to the *plumbicincta* group, in spite of possessing only four posterior cells. The type of abdominal marking is very similar, the grey bands in the middle of tergites 2-5, which are so conspicuous in this group, being distinctly traceable in some of the members of the *plumbicincta* group. The relationship is also indicated in the hypopygium, the penis being rather long and hooked (text-fig. 2 d), though not nearly so long as in the *plumbicincta* group. The side-pieces, however, have no trace of spiny basal lobes. *E. sauteriana* and *E. leucotela* have a hypopygium similar to that of *E. nepalensis*. The name *Pterocosmus* would be available for this group, the type-species being *P. velutinus* (= *E. nepalensis*). Both Westwood's and Walker's types are in fairly good condition in the Oxford and British Museums respectively.

The *nepalensis* group seems to be connected with the *dichroa* group through the *morosa* group.

EXPLANATION OF PLATE X. FIGS. 1-12.

Wings of Old-World species of *Eriocera*.

- Fig. 1. *Eriocera fusca*, Edw. × 3.
 Fig. 2. *E. umbripennis*, sp. n. × 2.5.
 Fig. 3. *E. robinsoni*, sp. n. × 2.5.
 Fig. 4. *E. flavicosta*, sp. n. × 2.5.
 Fig. 5. *E. kempi*, Brun., var. n. *longior*. × 2.5.
 Fig. 6. *E. albonotata*, Lw., var. n. *citrocastanea*. × 2.5.
 Fig. 7. *E. chrysomela*, sp. n. × 3.
 Fig. 8. *E. trimaculata*, sp. n. × 3.
 Fig. 9. *E. combinata*, Walk. × 3.
 Fig. 10. *E. leucotela*, Walk. × 3.
 Fig. 11. *E. infixa*, Walk. × 3.
 Fig. 12. *E. borneana*, sp. n. × 3.

IV.—New and little-known Tipulidæ, chiefly from Formosa.—

Part II. By F. W. EDWARDS.

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[Plate X. figs. 13-19.]

THIS paper is a continuation of one published by the writer under the above title in 1916 (Ann. & Mag. Nat. Hist. (8) xviii. pp. 245-269, pl. xii.), and deals chiefly with a further consignment of crane-flies received from Dr. T. Shiraki,

chief Entomologist of the Agricultural Experimental Station, Taiboku, Formosa, early in 1920, who has again generously presented all the types to the British Museum.

As in the previous paper, a few additional crane-flies from the Oriental and Eastern Palearctic regions have been dealt with; in this case, these all belong to the genus *Ctenacroscelis*.

The bibliography concerning Formosan Tipulidæ has been given in full by Alexander in a recent paper (Ann. Ent. Soc. Amer. xiii. pp. 249-270, Sept. 1920), and need not be quoted again here, but since, with those mentioned below, over 100 species have now been recorded from the island, it may be of use at this juncture to enumerate them.

List of the Crane-flies hitherto recorded from Formosa.

Ptychopteridæ.

Ptychoptera distincta, Brun.

— cf. *japonica*, Alex.

Tipulidæ.

LIMNOBIINÆ.

LIMNOBIINI.

Dicranomyia fullowayi, Alex.

[— *punctulata*, Meij.]

— *puncticosta*, Brun.

— *convergens*, Meij.

— *alticola*, Edw.

— *pleurilineata*, Ried.

— *nigrithorax*, Brun.

— *tenella*, Meij.

Thrypticomyia saltans (Dol.).

Geranomyia septemnotata, Edw.

[— *pulchripennis*, Brun.]

— *argentifera*, Meij.

— *atrostriata*, sp. n.

[— *montana*, Meij.]

Limnobia nigriceps (Wulp) (= *rectangularis* (Ried.).

— *xanthopteroides*, Ried.

— *nitobei*, Edw.

— *atriflorum*, Alex.

— *umbrata*, Meij.

Libnotes regalis, Edw.

— *transversalis*, Meij.

— *limpida*, Edw.

ANTOCHINI.

Helius nigriceps (Edw.).

[— ? *unicolor*, Brun.]

— *barbatus*, sp. n.

Teucholabis fenestrata, O.-S.

— *inornata*, Ried.

Teucholabis nigerrima, Edw. (= *unicolor*, Ried.).

Paratropeza (*Gymnastes*) *ornatipennis* (Meij.).

— (—) *shirakii*, Alex.

— (—) *hyalipennis*, Alex.

Atarba pallidicornis, Edw.

— *fuscicornis*, Edw.

Antochu javanensis, Alex.

ERIOPTERINI.

Gonomyia (*Gonomyia*) *metatarsata*, Meij.

— (—) *pruinosa*, Alex.

— (*Lipophleps*) *gracilis*, Skuse.

— (—) *nebulosa*, Meij.

Gnophomyia (*Gnophomyia*) *orientalis*, Meij.

— (—) *similis*, Edw.

— (—) *strenua*, Brun.

— (—) *nigra*, Brun.

— (*Dasytmallomyia*) *signata*, Brun.

Styringomyia formosana, Edw.

— *ceylonica*, Edw.

— *flava*, Brun.

— *flavitaris*, Alex.

Ormosia (*Rhypholophus*) *formosanus*, sp. n.

Molophilus costalis, Edw.

— *nigripes*, sp. n.

Taseocera fragilicornis, Ried.

Erioptera (*Impeda*) *nigroapicalis*, Alex.

— (—) *minuscula*, Alex.

— (*Erioptera*) *insignis*, Edw.

— (—) *albuguttata*, Edw.

— (—) *flava*, Brun.

Trentepohlia (*Trentepohlia*) *trentepohli* (Wied.).
 — (—) *albogeniculata* (Brun.).
 — (*Mongoma*) *pemipes*, O.-S.
Conosia *irrorata* (Wied.).

LIMNOPHILINI.

Limnophila (*Limnophila*) *inconcussa*, Alex.
 — (—) *nigronitida*, sp. n.
 — (*Dicranophragma*) *formosa*, Alex.
 — (*Ephelia*) *fascipennis*, Brun.
Epiphragma *kempî*, Brun.

HEXATOMINI.

Eriocera *verticalis*, Wied.
 — *nigrina*, Ried.
 — *sauteriana*, End.
 — *rubriceps*, Edw.
 — *shirakii*, Edw.
 [— *testacea*, Brun.]
 — *lygropis*, Alex.

PEDICINI.

Rhaphidolabis *brunettii*, Edw.
Tricyphona *formosana*, Alex.

TIPULINÆ.

CTENOPHORINI.

Pselliophora *ctenophorina*, Ried.
 — *hoppo*, Mats. (= *semirufa*, Edw.).
 — *sculator*, Alex.
 [— *taprobanes*, Walk.]
 — *laneipes*, sp. n.
Dictenidia *formosana*, Alex.

DOLICHOPEZINI.

Dolichopeza ? *orientalis*, Brun.
Nesopeza *gracilis*, Meij.
Oropeza *sauteri*, Ried.

TIPULINI.

Brithura *confrous*, Edw.
Longurio *rubriceps*, Edw.
Ctenacroscelis *clavipes*, sp. n.
 — *similis*, sp. n.
 [— *sikkimensis*, End.]
Tipula *holoserica*, Mats. (= *rufomedia*, Edw. = *nigrorubra*, Ried.).
 — *coquilletti*, End.
 — *nova*, Walk. (= *nohirai*, Mats. = *fumifusciata*, Brun.).
 — *formosicola*, Alex.
 — *yamata*, Alex.
 — *shirakii*, Edw.
 — *tridentata*, Alex.
 — *plurijuttata*, Alex.
 — *bicornuta*, Alex.
 — *subapterogyne*, Alex.
 — *flavicosia*, sp. n.
 — *quadrifulva*, sp. n.
 — *biserra*, sp. n.
 — *terebrata*, sp. n.
 — *arisanensis*, sp. n.
Nephrotoma *virgata* (Coq.).
 — *citrina* (Edw.).
 [— *serricornis*, Brun.]
 — *delta*, Walk.
 — *javensis* (Dol.).
 [— *bombayensis*, Mcq.]
 — *parva* (Edw.).
 — *formosensis*, Edw.
 [— *palloris*, Coq.]

The ten species mentioned in square brackets have been recorded by Riedel; their occurrence in Formosa requires confirmation, since in each case it is possible or probable that the species concerned was really the one immediately preceding in the above list.

LIMNOBIINÆ.

LIMNOBIINI.

Geranomysia *atrostriata*, sp. n.

Head, including antennæ and proboscis, blackish. *Front* very narrow, almost linear. *Flagellar* joints approximately equal, oval, last joint narrow and pointed. *Verticils* not

longer than the joints. Proboscis about as long as head and thorax together. *Thorax* blackish grey, slightly shining in certain lights; two dull black lines on the posterior half of the præscutum, interrupted at the suture, and continued across the scutum. Shoulders, wing-attachment, and most of sternopleura tinged with ochreous. *Abdomen* blackish above, ochreous below; hypopygium brownish ochreous, fleshy claspers elongate-oval, quite twice as long as the side-pieces; upper claspers small, deeply bifid, both branches curved, the outer one sharp-pointed, the inner with rounded tip. *Legs* dark brown; coxæ and trochanters ochreous. *Wings* slightly brownish-tinged; stigma dark brown; very small brown clouds at base of Rs and at tip of Sc. Sc₂ close to tip of Sc₁; the usual accessory cross-vein present connecting Sc and R; Rs nearly straight, longer than basal section of R₂₊₃; discal cell elongate, more than twice as long as broad, and somewhat longer than the veins beyond it; Cu_{1a} just before base of discal cell. Costal fringe very short, shorter than the fringe of the hind margin. *Halteres* with ochreous stem and dark brown knob.

Length of body (excluding proboscis) 6 mm.; wing 7 mm.; proboscis 2.2 mm.

FORMOSA: Ringaurin, Nanto, 18. xii. 1916 (*T. Shiraki*), 1 ♂.

This species seems most nearly allied to *G. montana*, Meij., differing in the short costal fringe and the two black lines on the thorax.

Libnotes limpida, Edw.

Ann. & Mag. Nat. Hist. (8) xvii. p. 355 (1916).

FORMOSA: Arisan, 25. iv. 1917 (*T. Shiraki*). Two females, agreeing closely with the type from the Malay States.

Libnotes transversalis, Meij.

Tijd. v. Ent. lix. p. 198 (1916).

FORMOSA: Arisan, 25. iv. 1917 (*T. Shiraki*), 1 ♂.

The specimen agrees closely with de Meijere's description. Although superficially very similar to *L. limpida*, it is really quite distinct.

ANTOCHINI.

Helius [*Rhamphidia*] *nigriceps* (Edw.).

Ann. & Mag. Nat. Hist. (8) xvii. p. 358 (1916).

FORMOSA: Arisan, 24. iv. 1917 (*T. Shiraki*), 1 ♂, 1 ♀.

Somewhat larger and darker than the original Siamese specimens, but identical in structure.

Helius barbatus, sp. n. (Text-fig.)

Closely allied to *H. nigriceps*, Edw., differing only in the structure of the antennæ and hypopygium. The antennæ are about as long as the head and proboscis together, the first three or four flagellar joints swollen, markedly broader than long, the next few joints gradually narrower but no longer, all with rather short dense hair; the last six joints long and very slender (especially the last) and each provided with a few long hairs, more than twice as long as the joint



Helius barbatus, sp. n.

Male hypopygium from above. $\times 40$.

bearing them. *Hypopygium*: ninth tergite produced into two conspicuous hairy points. The eversible anal segment with four narrow chitinous strips. Tips of side-pieces with long dense yellowish hair, the hairs microscopically serrate. Both pairs of claspers very broad, the outer one with the usual black bifid tip, and also with a double membranous lobe on the inner side.

FORMOSA: Arisan, 24. iv. 1917 (*T. Shiraki*), 1 ♂.

ERIOPTERINI.

Ormosia (Rhypholophus) formosanus, sp. n.

Head, thorax, and abdomen uniformly dark brownish, the abdomen somewhat darker; pubescence inconspicuous, pale. Palpi black. Antennæ dark brown, flagellar joints all shortly oval. Ovipositor reddish; genital valves long,

almost reaching tips of the gently curved anal valves. *Legs* dark brown, with a slight purplish sheen; front and middle femora with a narrow ring of yellowish pubescence before the tip, and another much narrower still at the extreme tips. (Hind legs missing.) *Wings* with the venation of *R. varius*, Mg. Cord somewhat darkened, but no clear spot in cell R_1 beyond the stigma. *Halteres* pale yellow, apical half of knob pure white.

Length of body 3·2 mm.; wing 4·8 mm.

FORMOSA: Noko, 11. v. 1919 (*T. Shiraki*), 1 ♀.

Apparently closely allied to *R. pulcher*, Brun., from which it differs in the unicolorous thorax.

Molophilus nigripes, sp. n.

Head dull dark grey. Palpi black. Antennæ longer than thorax, blackish; flagellar joints all rather elongate-oval, gradually and slightly diminishing in length, with one or two longish stiff hairs near base, and clothed in addition, except at base and tip, with long soft pubescence, about as long as the joint which bears it. *Thorax* dull black, with short black pubescence; a whitish line at margin of mesonotum. *Abdomen* black, slightly shining, with moderately long yellowish pubescence. Hypopygium: ventral lobe of side-piece long and narrow. Claspers long, rather slender, nearly straight; upper pair sharp-pointed, lower pair with rounded tips. *Ædœagus* not visible externally. *Legs* blackish, the trochanters yellow. *Wings* slightly greyish; costa and radial vein yellowish; hair rather light brown, paler towards costa. Ax ending slightly beyond fork of Cu. *Halteres* yellow.

Length of body 3·2 mm.; wing 4·8 mm.

FORMOSA: Noko, 11. v. 1919 (*T. Shiraki*), 1 ♂.

The only other described Oriental species with similar antennæ is *M. assamensis*, Brun., which has yellow legs.

LIMNOPHILINI.

*Epiphragma kemp*i, Brun.

Rec. Ind. Mus. viii. p. 155 (1913).

FORMOSA: Arisau, 25. iv. 1919 (*T. Shiraki*), 1 ♂.

Limnophila nigronitida, sp. n.

Head black, slightly dusted with grey. Palpi and antennæ black; antennæ shorter than the thorax; flagellar joints

roundish, somewhat more convex below, apical joints not much smaller than the basal ones; verticils about as long as the joints. *Thorax* and *abdomen* uniformly shining black, only the pleuræ slightly grey-dusted and the ovipositor reddish. *Legs* black, the femora and tibiæ brownish except at tips. *Wings* slightly greyish, unmarked except for the darker grey stigma. Sc ending distinctly in costa; Sc₂ near tip of Sc₁; *r* about its own length from tip of R₁, and at about mid-length of R₂; R₂₊₃ very short; Rs rather long and nearly straight; the three veins closing the upper basal cell rather thick and about equal in length; cell M₁ absent; cross-vein *m* very oblique, longer than basal section of M₃. Cu_{1a} before middle of discal cell. *Halteres* light yellow.

Length of body about 5 mm. ; wing 6 mm.

FORMOSA : Funkiko, 23. ii. 1917 (*T. Shiraki*), 1 ♀.

Among described Oriental species this can only be compared with *L. quartarius*, Brun., which has a similar venation, but is quite different in colour.

TIPULINÆ.

CTENOPHORINI.

PSELLIOPHORA lanceipes, sp. n. (Pl. X. fig. 14.)

Head orange, with black hair on the vertex, brownish to golden hair on the face and rostrum. Palpi with the three basal segments brownish, black-haired; terminal segment yellowish, black at the base and tip. Antennæ with the basal segment orange, with a dark brown stripe on the outer side; remainder black, except for the tips of the flagellar joints, which are light brownish. *Thorax* bright orange; præscutum with three distinct black stripes, the middle one entire, the lateral ones continued across the scutum. Scutellum with rather long and dense brownish-orange hair. *Abdomen* orange; a narrow black median stripe on tergites 2-4, interrupted with orange on the posterior margins of the segments, and continuous with the narrow black lateral posterior borders of these segments; venter similar. *Hypopygium* black. Ninth tergite with two rounded lobes, each provided with a long dense tuft of dark brown hair (much longer than in *P. scalator*, Alex.). Ninth sternite much as in *P. scalator* (deeply bilobed, each lobe with a strong smooth spine on its inner side). Eighth sternite produced into a cup-shaped process similar to that of *P. scalator*, but shorter. Outer claspers pointed, not square-

ended as in *P. scalator*. *Legs* with the coxæ and trochanters bright orange, the femora orange with the tips rather narrowly black; tibiæ and tarsi almost black. Front and middle femora with short black pubescence, hence appearing dark; hind femora with almost entirely orange pubescence, which on the inner side of basal half is very long and dense (as in males of the very differently coloured *P. divisa*, Brun., and *P. speciosa*, Edw.). Hind tibiæ with a rather narrow yellowish ring near the base. *Wings* resembling those of *P. scalator* (see Pl. X. figs. 13 & 14) in their black and yellow pattern, but all the apical cells of the wing are conspicuously yellow basally in their centres. *Rs* conspicuously spurred near base; cell M_1 rather broadly sessile; cells Cu_1 and Cu_2 of equal breadth at the margin; *m-cu* distinct. *Halteres* orange; knob with a black spot at the base above.

Length of body 17 mm.; wing 15×5 mm.

FORMOSA: Taito, 25. ii.-27. iii. 1919 (*S. Inamura*, *J. Sonan*, *M. Yoshino*), 1 ♂. Related to *P. scalator*, Alex., differing chiefly in the hypopygium and hind femora.

DOLICHOPEZINI.

Dolichopeza sp., cf. *orientalis*, Brun.

Fauna Brit. Ind., Nematocera, p. 354 (1913).

FORMOSA: Ringaurin, Nanto, 18. xii. 1916 (*T. Shiraki*), 1 ♂. Very similar to *D. orientalis*, Brun., but probably distinct, the white on the legs being less extensive. The specimen, however, is too damaged for purposes of description.

TIPULINI.

Tipula flavicosta, sp. n. (Pl. X. fig. 15.)

Head ash-grey, with a narrow black median line; sides of rostrum and palpi black. *Nasus* short, simple. *Antennæ* as long as the thorax, with the first three joints pale ochreous, the rest black. First flagellar joint nearly twice as long as the second, slightly longer even than the first scapal, nearly cylindrical; remaining flagellar joints (except the small terminal one) all about equal in length, very slightly enlarged at the base; verticils shorter than the joints. *Thorax* almost bare, ash-grey; præscutum with three slightly darker stripes, the middle one divided by a dark line; scutellum and postnotum dark grey. *Abdomen* somewhat shining, dark brownish, the last few segments almost black,

no distinct markings. Ninth tergite large, with a rather small median V-shaped notch. Eighth sternite large, square-ended, nearly covering the ninth. Outer claspers ochreous, broadly expanded at base, almost triangular. Inner claspers ochreous in the middle, with strongly blackened pointed tips; at the base with a strong straight sharp spine, and between this and the main portion a small flat horizontal lobe with a rounded edge. *Legs* black, only the coxæ grey and the extreme base of the femora yellowish. *Wings* (see Pl. X. fig. 15) with the base and the costal and subcostal cells and the veins bordering them yellow, otherwise greyish with some clear markings and dark-bordered veins. Tip of R_2 entirely atrophied beyond the cross-vein; *m-cu* very distinct. *Halteres* yellow.

Length of body 9 mm.; wing 11 mm.

FORMOSA: Noko, 11. v. 1919 (*T. Shiraki*), 1 ♂.

Nearly related to the Japanese *T. truphoneura*, Alex. (which is known only from the female), but differs in the pale first joint of the antennæ, simple nasus, darker legs, etc.

Tipula quadrifulva, sp. n. (Pl. X. fig. 19.)

Head: front bright ochreous on the upper part, whitish yellow just above the antennæ; vertex brownish ochreous, darker in the middle, with a blackish median line which does not extend on to the front. Rostrum ochreous with rather narrow blackish lateral stripes. Palpi brownish. Antennæ with the scape ochreous, flagellum blackish. First scapal joint elongate, twice as long as the first flagellar. Verticils longer than the joints. Flagellar joints (except the first) slightly swollen at the base; third and fourth equal in length, slightly longer than the first or second; last joint minute. *Thorax*: præscutum with four distinct dark olive-brown stripes, which have their outer borders slightly, their inner borders considerably, darkened; interspaces between the stripes pale greyish ochreous, with rather long fine yellowish hair. Scutum whitish grey on the front margin, the usual two large dark marks olive-brown, darkened on their anterior and inner edges. Scutellum and postnotum long-haired, greyish ochreous, with a conspicuous blackish-brown median line. Pleuræ uniformly ochreous. *Abdomen* with segments 1-4 ochreous-orange; 5-8 blackish, with the hind margins narrowly pale; tergites 5-8 together scarcely longer than tergite 4. Sternite 8 with its posterior corners produced into two short lobes, which are made more

conspicuous by being clothed with long yellowish hair, the middle part of the sternite convex. Ninth tergite with a rather small median projection, which is bifid and covered apically with small black spines. *Legs* blackish, femora ochreous towards the base. *Wings* with a conspicuous pattern (see Pl. X. fig. 19). *Halteres* ochreous-brown, knob mostly pale yellowish.

Length of body 14 mm. ; wing 18 mm.

FORMOSA: Musha, 10. v. 1917 (*T. Shiraki*), 1 ♂.

Evidently nearly allied to *T. marmoratipennis*, Brun., *T. serricornis*, Alex., and other species of the same large and rather difficult group. The wing-markings are extremely similar to those of the two species named, but the hypopygium differs.

Tipula biserra, sp. n. (Pl. X. fig. 18.)

Head ochreous, a roughly diamond-shaped dark mark on the vertex, continued forwards almost to base of antennæ; sides of rostrum somewhat darkened. *Palpi* blackish, the tips of the joints light brown. *Antennæ* ochreous, flagellar joints slightly enlarged and distinctly blackened at the base; verticils a little longer than the joints. First flagellar joint a little shorter than the first scapal; second and third flagellar joints distinctly shorter than the first and fourth; last joint minute. *Thorax* dull greyish brown, the præscutum with three dark brown stripes, which have slightly darker edges, the median stripe divided by an indistinct pale line. Scutellum and postnotum with a dark brown median line, not very conspicuous. Pubescence short and inconspicuous. *Abdomen* elongate, ochreous-brown, with continuous median and lateral dark brown longitudinal stripes. Ninth tergite long, almost equal to the long anal valves of the ovipositor; these latter almost straight, with two keels on the outer face, both of which are conspicuously serrate, the inner face hairy. Genital valves very short, not reaching base of anal valves. *Legs* dark brown; femora somewhat lighter, with black apical rings. *Wings* as in Pl. X. fig. 18; note particularly the uniformly brown apex, and the shape of the pale markings in the lower basal cell. *Halteres* blackish; base of stem ochreous, tip of knob yellowish.

Length of body 23 mm. ; wing 20 mm.

FORMOSA: Arisan, 24. iv. 1917 (*T. Shiraki*), 1 ♀.

Though this species is also obviously related to *T. serri-cauda*, Alex., and *T. serridens*, Alex., the resemblance is not

so close as in the case of *T. quadrifulva*, since the wing-markings show obvious differences. The two rows of teeth on each anal valve of the ovipositor have not been described in any other species, but may have been overlooked.

Tipula terebrata, sp. n. (Pl. X. fig. 16.)

Head brownish ochreous, sides of rostrum rather darker, the long nasus almost blackish. A black stripe extending from between antennæ almost to nape. Scape of antennæ ochreous, flagellum black. First flagellar joint shorter than first scapal, but nearly as stout; second and third flagellar joints slightly shorter than the first and fourth; remaining joints scarcely perceptibly enlarged at the base; verticils about as long as the joints. *Thorax* rather dark greyish buff, with short and inconspicuous pubescence. Præscutum with four olive-green stripes, which have conspicuously darker margins; the inner margins of the two middle stripes fused in front and almost black. Scutellum and postnotum with a sharply defined blackish median line. *Abdomen* ochreous-brown with a broad median and narrow lateral black longitudinal stripes; extreme side-margins of tergites whitish. Ninth tergite very long, longer even than the anal valves; these latter thick at the base, not flattened, almost straight, without any trace of serration on the outer keels; genital valves well-developed, but still not quite reaching the base of the anal valves. *Legs* moderately stout, blackish, femora brown except for the rather broad black apical rings. *Wings* as in Pl. X. fig. 16; note the conspicuous pale area round Rs. *Halteres* ochreous, base of knob blackish.

Length of body 22 mm.; wing 21 mm.

FORMOSA: Musha, 10. v. 1917 (*T. Shiraki*), 1 ♀.

Though similar in general appearance to the two above described, this species is really very distinct from either. It seems to be related to the Japanese *T. terebrina*, Alex., which is described as having a similar ovipositor.

Tipula arisanensis, sp. n. (Pl. X. fig. 17.)

Head ochreous with a median longitudinal black line. Palpi blackish. Antennæ with the scape ochreous; first flagellar joint much shorter than first scapal, ochreous, darkened in the middle; second, third, and fourth flagellar joints each shorter than the first or fifth, brownish ochreous, blackened at the base; remaining joints blackish brown,

slightly swollen at the base; all flagellar joints except the first and last with two moderately long hairs above, none below. *Thorax* brownish ochreous; the præscutum with three darker brown stripes, without dark borders, the middle stripe divided posteriorly by a pale line. Scutal lobes each with two separate dark brown spots. Scutellum and post-notum with a dark brown median stripe, most conspicuous when viewed from in front. *Abdomen* brown with rather obscure darker brown median and lateral longitudinal stripes; apical corners of tergites pale. Ninth tergite very long, longer than the anal valves, these of the normal form, flattened, pointed, only slightly enlarged at the base, without distinct outer keels. Genital valves well-developed, just reaching base of anal valves. *Wings* as in Pl. X. fig. 17; note the rather long fusion of Cu_1 and M_3 . *Halteres* ochreous, base of knob blackish.

Length of body 13 mm.; wing 14 mm.

FORMOSA: Arisan, 24. v. 1917 (*T. Shiraki*), 2 ♀.

I have not been able to trace a previous description of this species. The wing-markings are very similar to those of *T. quasimarmoratipennis*, Brun., which evidently belongs to the same group.

Tipula demarcata, Brun.

Rec. Ind. Mus. vi. p. 259 (1911).

FORMOSA: Suisha, Nanto, 22. xii. 1916 (*T. Shiraki*), 1 ♂, 1 ♀.

The female agrees closely with a female in the British Museum from Trincomali, Ceylon (*Lt.-Col. Verbury*), and also with Brunetti's rather imperfect description; the species is one of a group which is rather numerous in the Oriental region, distinguished by the unicolorous wings and very narrow axillary cell. *T. demarcata* is distinguished from the other species known to me by the grey thoracic pleuræ, contrasting noticeably with the brown dorsum. Other nearly allied species are *T. sulaica*, Walk., *T. vilis*, Walk., *T. walkeri*, Brun. (*fulvipennis*, Walk.), *T. gedehicola*, Alex., *T. korinchiensis*, Edw., etc. Some of these show good specific distinctions in the antennæ.

It may be noted here that Brunetti's *Pachyrrhina demarcata* is also a *Tipula*, and requires renaming. I suggest *Tipula sessilis*, nom. nov., basing the name on a male and female in the British Museum from the Nilgiri Hills, 6700 ft., 8. xii. 1887 (*Sir G. F. Hampson*).

Nephrotoma delta (Walker).*Tipula delta*, Walker, Ins. Saund. i. p. 445 (1856).*Pachyrhina dorsopunctata*, Brunetti, Rec. Ind. Mus. vi. p. 265 (1911).FORMOSA: Chyoshu, 21. xi. 1916 (*T. Shiraki*), 1 ♀.

Agrees well with Walker's type and with Brunetti's description.

CTENACROSCELIS, Enderlein.

The species dealt with below all belong to the *brobdignagius* group, the members of which are distinguished by their great size, brownish wings without conspicuous markings, vein Cu more or less dark-bordered, especially about the fork, and a narrow dark stripe on the ochreous pleuræ extending from the neck to below the wing-base; the præscutum has three almost confluent blackish-grey stripes, the middle one more or less distinctly divided by a dark line; the antennæ, except for the apical part of the flagellum, are light ochreous, and have the verticillate hairs very short, sometimes barely perceptible.

The *umbrinus* group shows a very similar coloration, but the insects are much smaller, the first joint of the antennæ is dark, and the præscutum generally has four dark stripes, the middle pair separated by a narrow pale line.

The *præpotens* group (*præpotens*, Wied., *monochrous*, Wied., *rex*, Alex., etc.) differs from the *brobdignagius* group in the absence of the dark pleural stripe. There is a female specimen of *C. præpotens* (Wied.) in the British Museum from Java, which is amply distinct from all the species of the *brobdignagius* group: the præscutum has four distinct dark stripes; the wings, apart from the yellowish stigma, are uniformly greyish, without a trace of darkening on vein Cu. Doubtless a number of species have been confused under the name *præpotens*, and its range is not likely to be so extensive as has been supposed. The specimen recorded by Walker from Nepal is not this species, but apparently *C. dives* (Brun.) or a very closely allied species; another example in the British Museum labelled *præpotens* is in reality *C. fulvolateralis* (Brun.) (? = *sikkimensis*, End.). Both these species belong to the *brobdignagius* group.

Ctenacroscelis clavipes, sp. n.

Head rather deep ochreous above, dark grey behind the eyes; pale ochreous beneath; sides of rostrum dark brown;

the usual blackish dot over the base of each antenna. Antennæ with the first few joints ochreous; flagellum mostly dark; first flagellar joint slender, as long as the first scapal, second and third shorter, almost cylindrical; the following joints somewhat convex beneath. *Thorax* coloured much as in the other species of the group. Middle præscutal stripe reaching front margin; pronotum with a dark spot above; scutellum yellowish with two dark spots, nearly contiguous, close to base; postnotum mostly dark brownish, more or less grey-dusted, a narrow median grey line enlarging at the tip into a grey spot. *Abdomen* dark brownish dorsally, with a rather broad ochreous median stripe, which is not distinctly traceable beyond the apex of the second tergite; rather narrow pale ochreous lateral stripes; venter pale, especially towards the base. *Hypopygium*: ninth tergite bilobed, the median excavation broadly V-shaped, each lobe on its outer face with a tuft of long golden hairs. Eighth sternite with the usual semi-circular excavation, with yellow hairs which are not very conspicuous. Outer clasper a little over twice as long as broad, almost square-ended, without conspicuous yellow hairs projecting inwards from its base. Inner claspers clubbed on the apical half. *Ovipositor* reddish; anal valves long, slender, straight, hairy beneath. *Legs* brownish ochreous, tarsi darker apically; femora and tibiæ rather broadly black at the tips; tips of hind tibiæ considerably swollen, especially in the male, in which sex the tip of the tibia for a distance of over a millimetre is more than twice the average diameter of the joint. Fifth tarsal joints of male modified in the usual way. *Wings* brownish-tinged, base, costal cell, stigma, and a suffusion in the base of the basal cells darker brown; a slight suffusion round the fork of Cu and at the extreme tip of Ax; a faintly indicated pale area above the discal cell, just before the stigma. Cross-vein *r* before base of R_2 ; Rs equal to R_{2+3} ; stem of cell M_1 very short, about one-eighth to one-sixth as long as the cell; M_1 and M_2 parallel; Cu_1a very oblique, fused for a short distance with M_3 . *Halteres* blackish, base of stem ochreous.

Length of body, ♂, 26–30 mm.; ♀, 35 mm. Wing 34–42 mm.

FORMOSA: Koshun, 25. iv. – 25. v. 1918 (*J. Sonan*, *K. Miyake*, and *M. Yoshino*), 1 ♂ (type). Taito, 25. ii. – 27. iii. 1917 (*S. Inamura*, *J. Sonan*, and *M. Yoshino*), 1 ♂. Kuskusu, 19. v. 1918 (*K. Miyake*), 1 ♀. NORTH CHINA (*Fortune*), 1 ♂. This last specimen is certainly conspecific

with those from Formosa, but differs in having the pale median stripe of the abdomen narrower and more distinct, extending as far as the sixth tergite.

Ctenacroscelis similis, sp. n.

Differs from *C. clavipes* as follows:—Flagellar joints almost cylindrical, scarcely convex beneath. Postnotum with a broad greyish median stripe, occupying about one-third of the width, sides dark brown. Anal valves of ovipositor not hairy beneath. Femora with the black tips less clearly marked; tibiæ scarcely darkened and not at all swollen apically. Pale area above the discal cell reduced to a small dot before the stigma; costal cell and stigma not quite so dark.

FORMOSA: Arisan, 24. iv. 1917 (*T. Shiraki*), 1 ♀ (type); a second female without precise locality, captured 6. iii. 1903 (*A. E. Wileman*).

Ctenacroscelis fulvolateralis (Brun.)

(? = *sikkimensis*, End.).

This species is nearly related to the above-described *C. similis*, but the pronotum is scarcely darkened; the middle præscutal stripe does not quite reach the front margin (except for the dark line in its centre); the postnotum is mainly dark greyish, paler on its apical margin, dark brown only on its extreme lateral edges; the stigma is pale brown, somewhat lighter than the costal cell, and there is a suggestion of a pale band along the middle of the wing from the base of the axillary cell to just before the stigma. The antennæ have distinct short verticillate hairs, and the flagellar joints convex beneath, as in *C. clavipes*, but the hind tibiæ are not swollen at the tip in either sex. The male hypopygium has the ninth tergite more deeply bilobed than in *C. clavipes*, the lobes without conspicuous golden hair-tufts, the inner claspers conspicuously clubbed at the tips. British Museum material is from Upper Burmah, Sikkim, and Nepal.

Ctenacroscelis majesticus (Brun.).

This is also nearly related to *C. similis* and *C. fulvolateralis*, the hind tibiæ not being enlarged or even darkened at the tips in either sex. From both these species it differs in the conspicuous ochreous patch just in front of the suture in the middle, the slightly but distinctly separated thoracic

stripes, and the almost uniformly coloured yellowish-brown wings, with hardly a trace of a stigma. The hypopygium has small golden hair-tufts on the lobes of the ninth tergite; the inner claspers are not clubbed at the tip as in *C. fulvo-lateralis*. The greyish-brown head; the sharply defined dark thoracic markings; the darkened tips of the femora; and the position of *r*, which joins R_{2+3} well before the fork, will suffice to distinguish *C. majesticus* from *C. fulvipes*, sp. n.

There are three males and one female in the British Museum from Sikkim: Gopaldhara, Rungbong Valley, 1920 (*H. Stevens*). The body-length of the males, exclusive of the head, varies from 20–30 mm.

Ctenacroscelis brobdignagius (Westw.).

Westwood's type male has the wings almost wholly yellowish brown, including the stigma; a small dark reddish-brown dot on each side of R_{2+3} close to its base; the hind tibiae are broadly black and somewhat swollen at the tip, but less so than in *C. clavipes*; the postnotum has a broad greyish-ochreous median stripe occupying quite half its width; the pale median stripe of the abdomen is broad and is scarcely traceable beyond the first segment.

Two males and a female from mountains 50 miles north-west of Chengtu, China (*W. N. Fergusson*), differ in having the wings more greyish brown; no dark dots at base of R_{2+3} ; the stigma and an area above and below it whitish, also the base of the axillary cell and a streak along each side of An whitish; the pale stripe on the postnotum is narrower; and the abdomen with a narrower and fairly distinct median pale stripe extending almost its whole length. I at first took these for a distinct species, which indeed they may be, but another male from Taipaishan, Shensi, 7. viii. 05 (*Lord Rothschild*), is about as intermediate as possible. The hypopygium is similar to that of *C. clavipes*, but lacks the golden hair-tufts on the lobes of the ninth tergite, these being represented merely by a few short yellow hairs. The wing-length varies (independently of sex) from 40–49 mm.

Ctenacroscelis fulvipes, sp. n.

Head, including antennæ, wholly ochreous, sides of rostrum darker; palpi blackish (at least at base); antennæ constructed as in *brobdignagius* and *clavipes*. *Thorax* ochreous, the brown pleural stripe of the *brobdignagius* group narrow, but distinct; præscutum with three broad greenish-brown stripes which are not dark-margined, the middle

one just divided, the lateral stripes crossing the scutum. Scutellum and postnotum wholly greyish ochreous. *Abdomen* brown, with an indistinct ochreous median longitudinal stripe, interrupted on the hind margins of the segments, and continuous lateral pale stripes. Ovipositor shining ochreous, anal valves slender, bare, but shorter and stouter than in *C. brobdignagius*, not greatly exceeding the genital valves in length. *Legs* almost wholly fulvous, only the ctenidia, spurs, and extreme tips of the tibiæ and tarsal joints black. *Wings* yellowish brown, costal cell and stigma concolorous; a slight smoky appearance on the lower part of the cord; tips of cells R_2 and R_3 indistinctly pale, also bases of cells M_1 and 2nd M_2 ; indistinct pale areas also in centres of cells Au and Ax. Cross-vein r just touching base of R_2 ; cell M_1 just sessile on one wing, with a just perceptible stalk on the other; M_1 and M_2 slightly convergent. *Halteres* with blackish knob and ochreous stem.

Length of body 32 mm.; wing 37×8 mm.

CHINA: mountains 50 miles north-west of Chengtu (*W. N. Fergusson*), 1 ♀. In several respects, notably the absence of black tips to the femora, the colour of the postnotum, and the sessile cell M_1 , this is quite a distinct species of the *brobdignagius* group.

Ctenacroscelis mikado (Westw.).

This differs from the other members of the *brobdignagius* group in the colour of the postnotum, which is dark brown in the middle, ochreous at the sides. The abdomen shows no trace of a pale median stripe; the ninth tergite of the male has a short dense black pubescence round its apical margin. The British Museum possesses a male and female from Yokohama (*H. Prior*) and a female from Miyanoshita, Japan (*Yerbury*), which have been identified by comparison with Westwood's type.

EXPLANATION OF PLATE X. Figs. 13-19.

Wings of Formosan Tipulidæ.

- Fig. 13. *Pseliophora scalator*, Alex. $\times 3$.
 Fig. 14. *P. laneipes*, sp. n. $\times 3$.
 Fig. 15. *Tipula flavicosta*, sp. n. $\times 2$.
 Fig. 16. *T. terebrata*, sp. n. $\times 2$.
 Fig. 17. *T. arisanensis*, sp. n. $\times 2$.
 Fig. 18. *T. biserra*, sp. n. $\times 2$.
 Fig. 19. *T. quadrifulva*, sp. n. $\times 2$.